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EXAMINER

PILKINGTON, JAMES

ART UNIT	PAPER NUMBER
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3656

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/646,704	Applicant(s) NAKAMURA ET AL.	
	Examiner JAMES PILKINGTON	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,8-10,16-20,22-25,27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,8-10,16-20,22-25,27,28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Prosecution Application

The RCE filed on 10/01/08 is acceptable and an action on the RCE follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 9, 10, 16-20, 22, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsergas, US PGPub 2004/0031343, in view of Yeh, US PGPub 2002/0124673 (cited in first office action), and further in view of Overhues, USP 5,112,179.

Re clms 1-3, 9, 10 27 and 28, Tsergas discloses a gear transmission device comprising:

- A pair of first (134B) and second fixed walls (111B), said first and second fixed walls opposing each other with respect to an axial direction of a first gear shaft (128)
- A first gear (122) positioned on said first gear shaft (128) between the first and second fixed walls (134B and 111B), said gear being axially movable with respect to said first and second fixed walls

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- A second shaft (126) having a relatively large diameter gear (136) on a first end and a relatively smaller diameter gear (121) on a second end, with a space (see Figure 2A) separating the relatively larger diameter gear (136) and the relatively small diameter gear (121)
- Wherein said small diameter gear (121) operatively engages said first gear (122)
- A large diameter ring gear (140) operatively engaged with said first gear (122, operatively engaged via gears on shaft 126)
- Where the first fixed wall (111b) is a crank shaft side wall (output crank 142) and the second fixed wall (134b) is another side wall

Tsergas does not disclose regulating means positioned between the first gear and the second fixed wall wherein the regulating means includes: a plane washer having one face positioned against a planar surface on an end face of the second fixed wall, a cylindrical portion being formed on a first opposed end face of the first gear, an elastic member positioned between the cylindrical portion and the plane washer, a predetermined space formed between the cylindrical portion and the plane washer, and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer.

Yeh teaches regulating means positioned between a first gear (3) and a fixed wall (9 and end portion of 8, see Figure 3) wherein the regulating means includes: a plane washer (7) having one face positioned against a planar surface (end portion of 8) on an end face of the second fixed wall (9), a cylindrical portion (formed by groove 42)

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being formed on a first opposed end face of the first gear (3), an elastic member (5) positioned between the cylindrical portion (outer ring formed by groove 42) and the plane washer (7), a predetermined space (between 7 and end face of 4) formed between the cylindrical portion and the plane washer, and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer (upon compression) for the purpose of providing an impact absorbing device in a gear transmission system (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Tsergas and provide regulating means positioned between the first gear and the second fixed wall wherein the regulating means includes: a plane washer having one face positioned against a planar surface on an end face of the second fixed wall, a cylindrical portion being formed on a first opposed end face of the first gear, an elastic member positioned between the cylindrical portion and the plane washer, a predetermined space formed between the cylindrical portion and the plane washer and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer, as taught by Yeh, for the purpose of providing an impact absorbing device in a gear transmission system.

Tsergas in view of Yeh as applied above does not disclose that the elastic member is a deformable closed ring, wherein an outer perimeter of the elastic member

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has a circular shape when viewed in plan view, and an inner perimeter of the elastic member has a non-circular shaped when viewed in plan view.

Overhues teaches an elastic member (spring/wave washer) that is a deformable closed ring in the form of a wave washer, and wherein an outer perimeter of the elastic member has a circular shape (1) when viewed in plan view (see Figures 7a and 7b), and an inner perimeter of the elastic member has a non-circular shape (at 4) when viewed in plan view.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsergas in view of Yeh with an elastic member that is a deformable closed ring that is in the form of a wave washer, and wherein an outer perimeter of the elastic member has a circular shape when viewed in plan view, and an inner perimeter of the elastic member has a non-circular shape when viewed in plan view since substituting one elastic member for another (spring of Yeh with spring/wave washer of Overhues) would achieve predictable results of removing vibration from the system well simplifying the gear structure required with a spring (i.e. no bore is required in the gear to hold the spring) thus reducing manufacturing/assembly time and cost.

Re clm 16, Tsergas in view of Yeh and Overhues discloses that the plane washer (7) is disposed in a position opposite said cylindrical portion (as disclosed by Yeh above).

Re clms 17-20 and 22, Tsergas discloses a gear transmission device comprising:

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- A pair of first (134B) and second fixed walls (111B), said first and second fixed walls opposing each other with respect to an axial direction of a first gear shaft (128)
- A first gear (122) positioned on said first gear shaft (128) between the first and second fixed walls (134B and 111B), said gear being axially movable with respect to said first and second fixed walls
- A second shaft (126) having a relatively large diameter gear (136) on a first end and a relatively smaller diameter gear (121) on a second end, with a space (see Figure 2A) separating the relatively larger diameter gear (136) and the relatively small diameter gear (121)
- Wherein said small diameter gear (121) operatively engages said first gear (122)
- A large diameter ring gear (140) operatively engaged with said first gear (122, operatively engaged via gears on shaft 126)
- Where the first fixed wall (111b) is a crank shaft side wall (output crank 142) and the second fixed wall (134b) is another side wall

Tsergas does not disclose regulating means comprising an elastic member positioned between said first gear and said second fixed wall, a single cylindrical portion being formed on a first opposed end face of the first gear, the cylindrical portion facing in a direction toward a planar surface on the end face of the second fixed wall, wherein the elastic member is surrounded by said cylindrical portion and wherein the regulating

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means includes a plane washer disposed in a position opposite to said cylindrical portion.

Yeh teaches regulating means comprising an elastic member (5) positioned between a first gear (3) and a fixed wall (9 and end portion of 8, see Figure 3), a single cylindrical portion (outer ring formed by groove 42) being formed on a first opposed end face of the first gear (3), the cylindrical portion facing in a direction toward a planar (end portion of 8) surface of the fixed wall, wherein the elastic member (5) is surrounded by said cylindrical portion (see Figure 3) and wherein the regulating means includes a plane washer (7) disposed in a position opposite the cylindrical portion for the purpose of providing an impact absorbing device in a gear transmission system (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Tsergas and provide regulating means comprising an elastic member positioned between said first gear and said second fixed wall, a single cylindrical portion being formed on a first opposed end face of the first gear, the cylindrical portion facing in a direction toward a planar surface on the end face of the second fixed wall, wherein the elastic member is surrounded by said cylindrical portion and wherein the regulating means includes a plane washer disposed in a position opposite to said cylindrical portion, as taught by Yeh, for the purpose of providing an impact absorbing device in a gear transmission system.

Tsergas in view of Yeh as applied above does not disclose that the elastic member is a deformable closed ring wave washer, wherein an outer perimeter of the elastic member is substantially equal to an inner diameter of the cylindrical portion and wherein an inner perimeter of the elastic member has a non-circular shaped when viewed in plan view.

Overhues teaches an elastic member (spring/wave washer) that is a deformable closed ring in the form of a wave washer, wherein an outer perimeter of the elastic member is substantially equal to an inner diameter of the cylindrical portion (when combined the elastic member of Overhues would need to be sized in such a manner do as to fit the gear and shaft) and wherein and an inner perimeter of the elastic member has a non-circular shape (at 4) when viewed in plan view.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsergas in view of Yeh with an elastic member that is a deformable closed ring that is in the form of a wave washer, wherein an outer perimeter of the elastic member is substantially equal to an inner diameter of the cylindrical portion since substituting one elastic member for another (spring of Yeh with spring/wave washer of Overhues) and an inner perimeter of the elastic member has a non-circular shape when viewed in plan view would achieve predictable results of removing vibration from the system well simplifying the gear structure required with a spring (i.e. a bore that constrains the spring and prevents the spring from sliding to a different radial distance from the shaft is no longer required) thus reducing manufacturing/assembly time and cost.

3. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsergas, US PGPub 2004/0031343, in view of Yeh, US PGPub 2002/0124673.

Re clms 23 and 24, Tsergas discloses a gear transmission device comprising:

- A pair of first (134B) and second fixed walls (111B), said first and second fixed walls opposing each other with respect to an axial direction of a first gear shaft (128)
- A first gear (122) positioned on said first gear shaft (128) between the first and second fixed walls (134B and 111B), said gear being axially movable with respect to said first and second fixed walls
- A second shaft (126) having a relatively large diameter gear (136) on a first end and a relatively smaller diameter gear (121) on a second end, with a space (see Figure 2A) separating the relatively larger diameter gear (136) and the relatively small diameter gear (121)
- Wherein said small diameter gear (121) operatively engages said first gear (122)
- A large diameter ring gear (140) operatively engaged with said first gear (122, operatively engaged via gears on shaft 126)

Tsergas does not disclose that the first gear has a cylindrical portion formed on one side thereof and regulating means comprising an elastic member having first and second surfaces, the elastic member being disposed directly around the first gear shaft with the first side thereof directly facing the fixed gear, a plane washer disposed directly

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around the first gear shaft, the plane washer having a first side with an inner surface portion directly facing a second surface of the elastic member, an outer surface portion disposed radially outward with respect to the inner surface portion and directly facing end of the cylinder portion, wherein the regulating means is adapted to regulate an increase of a bending amount of the elastic member by a predetermined value and when the elastic member is in a compressed state, only the outer surface portion of the plane washer is able to contact the end of the cylinder portion.

Yeh teaches a gear (3) having a cylindrical portion (4, created by groove (42) formed on one side thereof and regulating means comprising an elastic member (5) having first and second surfaces (end in the gear and end on the washer), the elastic member being disposed directly around the first gear shaft (11) with the first side thereof directly facing the fixed gear (3), a plane washer (7) disposed directly around the first gear shaft (11), the plane washer (7) having a first side with an inner surface portion directly facing a second surface (end contacting plane washer) of the elastic member (5), an outer surface portion (outside of spring 5) disposed radially outward with respect to the inner surface portion and directly facing the end of the cylinder portion (4), wherein the regulating means is adapted to regulate an increase of a bending amount of the elastic member by a predetermined value (comes in contact with the plane washer to regulate) and when the elastic member is in a compressed state, only the outer surface portion of the plane washer is able to contact the end of the cylinder portion (when compressed the spring expands radially therefore only the outer surface of the

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spring will contact the cylindrical portion) for the purpose of providing an impact absorbing device in a gear transmission system (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Tsergas and provide a cylindrical portion formed on one side of the gear and regulating means comprising an elastic member having first and second surfaces, the elastic member being disposed directly around the first gear shaft with the first side thereof directly facing the fixed gear, a plane washer disposed directly around the first gear shaft, the plane washer having a first side with an inner surface portion directly facing a second surface of the elastic member, an outer surface portion disposed radially outward with respect to the inner surface portion and directly facing end of the cylinder portion, wherein the regulating means is adapted to regulate an increase of a bending amount of the elastic member by a predetermined value and when the elastic member is in a compressed state, only the outer surface portion of the plane washer is able to contact the end of the cylinder portion, as taught by Yeh, for the purpose of providing an impact absorbing device in a gear transmission system.

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsergas '343 in view of Yeh '673 and Overhues '178.

Tsergas in view of Yeh discloses all of the claimed subject matter as described above. Yeh further discloses that the end face of the fixed wall (9) is smaller than the cylindrical portion (formed by groove 43, end of 4, see Figure 2) formed on the first gear (3).

Tsergas in view of Yeh does not disclose that the one face of the plane washer is larger than the end face of the second fixed wall.

It would have been an obvious matter of design choice to make the one face of the plane washer larger than the end face of the fixed wall, since such a modification would have involved a mere change in size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art.

5. Claims 1-3, 8, 9, 10, 16, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsergas, US PGPub 2004/0031343, in view of Yeh, US PGPub 2002/0124673 (cited in first office action), and further in view of Kitamura, USP 6,763,552.

Re clms 1-3, 9, 10, 27 and 28, Tsergas discloses a gear transmission device comprising:

- A pair of first (134B) and second fixed walls (111B), said first and second fixed walls opposing each other with respect to an axial direction of a first gear shaft (128)
- A first gear (122) positioned on said first gear shaft (128) between the first and second fixed walls (134B and 111B), said gear being axially movable with respect to said first and second fixed walls
- A second shaft (126) having a relatively large diameter gear (136) on a first end and a relatively smaller diameter gear (121) on a second end,

with a space (see Figure 2A) separating the relatively larger diameter gear (136) and the relatively small diameter gear (121)

- Wherein said small diameter gear (121) operatively engages said first gear (122)
- A large diameter ring gear (140) operatively engaged with said first gear (122, operatively engaged via gears on shaft 126)
- Where the first fixed wall (111b) is a crank shaft side wall (output crank 142) and the second fixed wall (134b) is another side wall

Tsergas does not disclose regulating means positioned between the first gear and the second fixed wall wherein the regulating means includes: a plane washer having one face positioned against a planar surface on an end face of the second fixed wall, a cylindrical portion being formed on a first opposed end face of the first gear, an elastic member positioned between the cylindrical portion and the plane washer, a predetermined space formed between the cylindrical portion and the plane washer, and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer.

Yeh teaches regulating means positioned between a first gear (3) and a fixed wall (9 and end portion of 8, see Figure 3) wherein the regulating means includes: a plane washer (7) having one face positioned against a planar surface (end portion of 8) on an end face of the second fixed wall (9), a cylindrical portion (formed by groove 42) being formed on a first opposed end face of the first gear (3), an elastic member (5) positioned between the cylindrical portion (outer ring formed by groove 42) and the

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plane washer (7), a predetermined space (between 7 and end face of 4) formed between the cylindrical portion and the plane washer, and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer (upon compression) for the purpose of providing an impact absorbing device in a gear transmission system (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Tsergas and provide regulating means positioned between the first gear and the second fixed wall wherein the regulating means includes: a plane washer having one face positioned against a planar surface on an end face of the second fixed wall, a cylindrical portion being formed on a first opposed end face of the first gear, an elastic member positioned between the cylindrical portion and the plane washer, a predetermined space formed between the cylindrical portion and the plane washer and wherein the cylindrical portion is capable of operative contact with said planar end surface of said end wall through direct contact with the plane washer, as taught by Yeh, for the purpose of providing an impact absorbing device in a gear transmission system.

Tsergas in view of Yeh as applied above does not disclose that the elastic member is a deformable closed ring, wherein an outer perimeter of the elastic member has a circular shape when viewed in plan view, and an inner perimeter which contacts the shaft of the elastic member has a non-circular shaped when viewed in plan view.

Kitamura teaches an elastic member (21) that is a deformable closed ring in the form of a wave washer, and wherein an outer perimeter of the elastic member has a circular shape when viewed in plan view (see Figure 5a), and an inner perimeter (within 21c) which contacts shaft of the elastic member (21) has a non-circular shape (see Figure 5a) when viewed in plan view.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsergas in view of Yeh with an elastic member that is a deformable closed ring that is in the form of a wave washer, and wherein an outer perimeter of the elastic member has a circular shape when viewed in plan view, and an inner perimeter which contacts the shaft of the elastic member has a non-circular shape when viewed in plan view since substituting one elastic member for another (spring of Yeh with spring/wave washer of Kitamura) would achieve predictable results of removing vibration from the system well simplifying the gear structure required with a spring (i.e. no bore is required in the gear to hold the spring) thus reducing manufacturing/assembly time and cost.

Response to Arguments

6. Applicant's arguments with respect to claims 1-3, 9-10, 16-20, 22, 25, 27 and 28 have been considered but are not persuasive.

7. Re clms 1 and 17 the Applicant argues that Overhues does not disclose an inner perimeter that has a non-circular shape.

The claims do not state that the inner perimeter needs to be the same inner perimeter that contacts the shaft. Overhues teaches a wave washer that has an inner and outer perimeter and a groove in the surface which also an inner and outer perimeter. It is the inner perimeter of the groove that is non-circular. The only claim which limits the inner perimeter to the perimeter which contacts the shaft is claim 8 which is rejected above as Tsergas in view of Yeh and further in view of Kitamura.

Regarding the new limitation which states the first wall (111b Tsergas) is a crankshaft side wall (the crankshaft being 142 Tsergas) this Tsergas does indeed disclose as applied in the rejection above.

8. Applicant's arguments filed 9/05/08 with respect to claim 23 have been fully considered but they are not persuasive.

The Applicant argues that because the gear contacts the washer on the inner and outer side of the groove 42 it does not meet the limitations of the claim.

The claim does not limit the device to only one cylindrical portion which contacts the plane washer. First the claim is open end which allows for there to be multiple cylindrical portions, Yeh shows two (one inside of groove 42 and one outside). This claim also does not structurally define the elastic means and therefore a coil spring meets this limitation. When the coil spring compresses both the cylindrical portions do indeed contact, however there is at least one that does so and therefore the structural limitations of the claim have been met. NOTE: this is also similar to claim 17 which

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recites a single cylindrical portion but the claim is still opened which allows for more as long as there is one.

9. Regarding the Applicants position on the prior final office action: The Applicant's amendment to the claims introduced new structure of the wave washer to the claims, this new structure did indeed necessitate the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Pilkington whose telephone number is (571) 272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/J. P./
Examiner, Art Unit 3656
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/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656